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The Effect of Institutional Variables on Economic Growth in Iraq

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Abstract:
The research aims to measure the impact of some institutional variables on the growth of the Iraqi economy during the period (2004-2019). The research problem focused on the following question: Iraq has many natural and human resources, but the country has not achieved growth consistent with the size of these resources. Did institutional factors play a role in disrupting the desired economic growth in Iraq? The research selected two governance variables and three doing business variables prepared by the World Bank. The research used the Vector Error Correction Model, after converting the data to semi-annual data, using the EViews 12 program to estimate the effect of the independent variables (Regulatory Quality, Rule of Law, Cost of business start-up procedures, Registering Property-Cost, and Score Starting Business) on dependent variable represented by the gross domestic product. The research found that the independent variables had a significant impact on the gross domestic product in the long term, and The CointEq1 coefficient indicates that the model tends to adjust slowly in the long term, which means that the Iraqi economy requires more time to return to the stable path. The results in the short run became insignificant and different from the results in the long run.

Keywords: Regulatory Quality, Rule of law, Cost of business, Registering Property-Cost, Score Starting Business, the Iraqi economic.

1. Introduction:

The study of the determinants of growth has been at the core of economics since its inception. The answer to the question of why the world is divided into rich and poor countries goes to the study of the factors that contribute to economic growth as well (Divanbeigi & Ramalho, 2015). Therefore, the study of economic growth factors is one of the main ways to improve the well-being of societies, and all people of the world seek to raise economic growth rates.

Economic growth is an integrated process in which several significant factors are contributed, including human capital, physical capital, geographical factors, and technology (Alali, 2010). In addition to these factors, institutional theory has added factors other than those focused on by traditional economics, which are institutional factors (Nguyen et al., 2018). These factors consist of the quality of institutions, the role of law, political stability, the quality of organization, the protection of property, the facilitation of business, and the like, as well as values and customs. Thus, the process of economic growth is shaped by long-term historical forces and is affected by short-term shocks (Dima & Dima, 2018). The macroeconomic goal of raising productivity and achieving exchange rate stability can also be achieved through targeted government policy with a solid institutional framework (Opuala et al., 2023). Organizational quality plays a very important role because it supports innovations, which are considered the decisive factor for sustainable growth in the long term (Razhkouskaya, 2023). The rules of law and the protection of private property have no less role in creating reassurance among owners of production factors and investors. Low costs and easy and smooth procedures for starting a business contribute to encouraging economic activity and increasing economic growth by supporting entrepreneurial activity and reducing corruption. The opposite occurs in the case of complex procedures and high costs (Saltane, 2013). In the absence or weakness of these institutions, the initiatives and incentives provided by the government to encourage economic growth will be of no use or will produce negative results (Rodrik, 2000). (Rodrik, 2004) states that there is a great agreement among experts who are interested in economic growth that the quality of institutions represents the key to the prevailing prosperity in the world. Unlike poor countries, rich countries are those that have institutions that ensure the security of property, enjoy the rule of law, protect social goals, and have strong financial institutions that adopt efficient monetary and fiscal policies.

Iraqi state has inherited an environment of political and economic instability, which was reflected in the formation and quality of institutions. The country was ranked 161 out of 163 countries in the Global Peace Index in 2017 (Economics & Peace, 2014). The cost of violence on the Iraqi economy amounted to 17.7% of the gross domestic product in 2013, down to 14% in 2023 (Institute for Economics & Peace, 2023). Iraq's performance in governance indicators was low (www.govindicators.org), as well as in business doing indicators

I have a group of a Ja rule of a set or loss of lives across almost half the cost of the house of that the level of the owners of us are known to have earned him and leave it as an array to coalesce cutting has an off the hook death if you need has and has a long long time due to higher diesel and when the sun seems to have an added A. Xiong Y showers of household in his beh a is used th F and have a ousted his father or flow has a sore shoulder the loss of the year as we're trying to me of a shock of the SM in all – one in a special powers to get the shot it was one of those of the scale of nominal element of our lives of the law in The world who have the (https://subnational.doingbusiness.org/).

According to what is mentioned so far, it is useful to study the role of these variables in economic growth in Iraq to know the impact of these factors on economic growth and then work to reduce the negative effects of factors that hinder growth and increase the contribution of factors with a positive impact. The problem with the research is that Iraq has many natural and human resources, but the country has not achieved growth consistent with the size of these resources. That is, did institutional factors play a role in disrupting the desired economic growth in Iraq? So, this research aims to measure the impact of institutional variables related to the role of law, regulation, and facilitation of business on the growth of the gross domestic product in Iraq.

In addition to the introduction, the research is structured into several sections, each addressing a key aspect of the study. These include the Literature Review, which examines relevant theoretical and empirical studies; the Material and Methods section, which outlines the data sources, variables, and econometric techniques used; and the Discussion of Results, which interprets the empirical findings in relation to economic theory. The study also includes a section on Diagnostic Tests for Model Validity, ensuring the robustness and reliability of the results. The Conclusion summarizes the key findings and their implications, while the Limitations and Recommendations section acknowledges the study's constraints and suggests directions for future research and policy considerations.

2. Literature Review:

A study of six war-torn countries (Afghanistan, Syria, Iraq, Yemen, Libya, and Cameroon) (Dirir, 2023) demonstrated that using three different models to measure the relationship between good governance indicators and economic growth, political stability and regulatory quality positively affect economic growth in the long run according to the PMG model. The fixed effects model also concluded that a 1% improvement in political stability increased GDP by 4.5%. Conversely, controlling corruption and the rule of law reduced economic growth. In a study somewhat similar to the previous study, (Gasimov et al., 2023) examined the long-term impact of the institutional environment on economic growth of some former Soviet Union countries during the period (1996-2021) using the Autoregressive Distributive Lag model. The research found a U-shaped relationship between four out of six factors of institutional quality and economic growth, namely (Political Instability and Violence, Government Effectiveness, Rule of Law, and Control of Corruption), while the relationship between two factors (Regulatory Quality, Voice and Accountability) and economic growth was in the shape of an inverted U.

Regarding the impact of governance variables, Aytekin (2022) chose 170 countries to measure the impact of (political stability, absence of violence, government effectiveness, regulatory quality, rule of law, and anti-corruption) as independent variables that had an impact on economic growth during the period from 2002 to 2020 using panel data. The study concluded that the selected variables had a positive impact on economic growth. He also concluded that countries might suffer from poverty and backwardness subject to corrupt authority, political instability, and weak rule of law and institutions.

As far as Iraq is concerned, the researchers (Saleh et al., 2022) tested the impact of the six governance variables on economic growth in Iraq for the period 1996-2020 using (the ARDL) model. The study reached a number of conclusions, including the six governance indicators showed that Iraq had a low performance in these indicators, including the weak rule of law and regulatory quality. The study concluded that the indicators of government effectiveness, voi ce, and accountability had an important and positive impact on economic growth, while the political stability indicator had a negative impact.

In a study of 29 emerging economies during the period (2002-2015), (Nguyen et al., 2018), on the one hand, found that the impact of each of the factors (control of corruption, government effectiveness, rule of law, and voice and accountability) was significant on improving the growth of per capita GDP, but political stability and regulatory quality did not have a significant impact on the growth of per capita GDP despite the existence of a positive relationship between them. Also, the impact of all these factors was not significant on GDP growth. On the other hand, the study found that institutional quality had a negative impact on GDP growth in terms of trade openness and foreign direct investment. The study used the employing System Generalized Method of Moments (SGMM) estimators' model to measure the relationship between the variables.

Domestic investment versus foreign direct investment is another issue to focus on in this respect. (Munemo, 2014)'s study concentrated on the impacts of these two variables on economic growth by studying the regulations required to start economic activity in 138 countries during the period (2000-2010). The study concluded that reducing the costs of entering a business increased the positive impact of foreign investment on domestic investment.

Integrating the impact of ease of doing business and governance variables on economic growth was the focus of researchers (Opuala b, et.al, 2023) in 41 Sub-Saharan countries during the period (2010-2020). Using data on 8 out of 11 variables of ease of doing business and 3 out of 6 variables of governance and using a random regression model, the study found a negative relationship between political stability and regulatory requirements and that ease of doing business contributed to increasing economic growth.

Regarding comparing the impact of institutional variables from the investment and productivity channels on economic growth, the researchers (Parsa & Datta, 2023) aimed to study the dynamic impact of institutions on economic growth in 87 countries divided into two groups, i.e., a group of high-income and middle income during the period (2000-2020). The study found that the institutions influenced economic growth through investment more than the total factor productivity channel, and it was also concluded that the quality of regulation had a greater impact on economic performance in high-income countries, while the impact of good legal systems and protected property rights was greater in middle-income countries. In a study on the role of ease of doing business variables on economic growth in 44 African countries during the period (2010-2018), (Bétila, 2021), The study found that ease of doing business had a positive impact on economic growth in these countries. The researchers (Dima & Dima, 2018) sought to evaluate the impact of the regulatory framework on economic growth in 65 low-income and lower-middle-income countries during the period (2005-2014). The study used a set of variables taken from Country Policy and Institutional Assessment (CPIA) in addition to other explanatory variables. The study found a significant positive relationship between the quality of business environment regulation and growth, meaning that countries with policies that support business enjoy a higher growth rate. The study (Avram & Brad, 2017) dealt with how social and economic development indicators affected the procedures, time, and cost required to start an economic activity; 125 countries were selected as a sample of the study from all countries of the world. The study concluded that there was an inverse relationship between social and economic development indicators, on the one hand, and the procedures, time and cost, on the other hand, to start a business, i.e., improvement in the indicators reduced the procedures, time and cost to start a business.

On the relationship between the establishment of new companies and business regulations and between regulations and the growth of per capita GDP in 180 countries for ten years, researchers (Divanbeigi & Ramalho, 2015) used a wide range of independent. The study concluded that countries with better regulatory regimes had higher levels of new business entry, with a 10-point improvement in regulatory regimes increasing the entry of new businesses by 0.6 new businesses per 1,000 adults and a 10-point increase in the efficiency of entry procedures (time to start a business) and exit procedures increasing the entry of new businesses by 0.3 new businesses per 1,000 adults. It was also concluded that the relationship between GDP per capita growth and small regulations was not strong, but in countries with large changes, it had a significant effect. Regarding legal indicators, the study found that a one-point improvement led to a 0.09-point increase in growth. In their paper, (Saltane and Pan, 2013) provided an explanation of the Doing Business report and pointed out that business registration remains a complex and expensive process in many countries around the world. For example, in Gambia and Djibouti, the cost of establishing a company was about 180% of the per capita income, and the process of registering a company in Sao Paulo, Brazil, took more than 100 days.

They pointed to several empirical studies indicating that facilitating the start-up of an economic activity increased the number of entrepreneurs. (Ibrahim, 2007) investigated the impact of property registration on economic growth in Egypt and found that less costly procedures encouraged increased property registration, which in turn opened the way for property owners to obtain loans and increase investment.

Klapper (2010) studied the impact of reforms in procedures, costs, and time taken to register companies on the increase in new companies in 91 countries. The study concluded that small reforms that reduce costs and time by 40% had no effect on the increase in new company registrations. It also concluded that countries with weak business environments need larger reforms to increase the number of new companies. It found that reforms will have a greater impact if they include more than one aspect and extend over a longer period.

This research differs from previous studies, especially from studies that dealt with the Iraqi economy, by integrating two groups of variables, namely governance variables and ease of doing business variables.

3. Material and Methods:

3.1 Variables Definition:

Institutions, according to economists, mean property rights, good and honest government, political stability, the rule of law, and efficient and competitive markets). North defined institutions as formal and informal rules and regulations, along with mechanisms for implementing laws and regulations (Nye, 2008). Institutions are also known as a tool for reducing risks and uncertainty, i.e., risks are not only natural risks and prices but also include the risk of losing ownership and non-compliance with contracts, so institutions work to reduce risks and uncertainty by establishing structures that regulate these aspects (Kniepert, 2017).

The classical answer to the differences in economic performance between countries is limited to capital, natural resources, and access to technology. However, institutional theory turns attention to other factors that may also help explain this disparity, the existence of stable rules for economic policies, protection of property rights, and effective institutions are important factors in supporting economic growth. (Nye, 2008). Also, the relationship between growth and institutional factors emerges from growth strategies, which means economic policies and institutional rules aiming to raise the standard of living to the levels prevailing in developed countries (Rodrik, 2005).

Economists, institutions, and international organizations have been interested in developing regulations on how to encourage investment and increase economic growth, and they have developed indicators that measure the economic and administrative status of countries. For example, Rodrik, 2000) chose five institutions that supported the markets, which were (property rights, regulatory institutions, institutions for macroeconomic stabilization, institutions for social insurance, and institutions of conflict management).

The World Bank developed a package of indicators that measured governance at the global, group, and country levels. This package consisted of six indicators as follows: (Control of Corruption, Government Effectiveness, Political Stability and Absence of Violence, Regulatory Quality, Rule of Law, Voice, and Accountability)
(https://www.worldbank.org/en/publication/worldwide-governance-indicators). The World Bank also developed the Doing Business Indicators, which consisted of 10 pillars, each of which included a number of indicators. These pillars were: (Starting a business, obtaining building permits, obtaining electricity, registering property, obtaining credit, protecting minority investors, paying taxes, trading across borders, enforcing contracts, and resolving insolvency) (https://archive.doingbusiness.org/en/).

The Country Performance Assessment Index (CPIA) also measures the effectiveness of institutions and policies in supporting sustainable growth and reducing poverty. The index contains 16 criteria, divided into four groups as follows: The first group is called economic management, the second group is structural policies, and includes - trade - the financial sector - the business regulatory environment. The third group is social inclusion and equality policies and includes - gender equality - equality in the use of public resources - building human resources - social protection and work - policies and institutions for environmental sustainability. The fourth group is public sector management and institutions and includes - property rights and governance - the quality of financial management and budget - efficiency of revenue mobilization - the quality of public administration - transparency, accountability, and corruption in the public sector. Each of these groups has an equal weight (25%) of the final score, with the index value ranging from 1 (low) to 6 (high) (World Bank, 2022).

Below is a definition of the variables selected for this research according to their sources (Quoted verbatim)

GDP (constant 2015 US$) (GDP): "GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2015 prices, expressed in U.S. dollars. Dollar figures for GDP are converted from domestic currencies using 2015's official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used."

Regulatory Quality (RQ): "Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e., ranging from -2.5 to 2.5".

Rule of Law (RL): "Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e., ranging from -2.5 to 2.5".

Cost of Business start-up Procedures (% of GNI per capita) (CS): "This indicator measures Cost to register a business is normalized by presenting it as a percentage of gross national income (GNI) per capita."

Registering Property-Cost (%of property value) (RPC): "The cost is the total of official costs associated with completing the procedures to transfer the property, expressed as a percentage of the property value, assumed to be equivalent to 50 times income per capita. It is calculated as a percentage of the property value. Only official costs required by law are recorded, including fees, transfer taxes, stamp duties and any other payment to the property registry, notaries, public agencies, or lawyers. Other taxes, such as capital gains tax or value added tax, are excluded from the cost measure. Both costs borne by the buyer and the seller are included. If cost estimates differ among sources, the median reported value is used."

Score starting business (SS): "The score for starting a business is the simple average of the scores for each of the component indicators: the procedures, time, and cost for an entrepreneur to start and formally operate a business, as well as the paid-in minimum capital requirement. The index value ranges between zero and one hundred, where 0 represents the lowest level and 100 represents the highest level of ease of doing business".

3.2 Methodology and Data:

Considering previous studies, research objective and data availability, institutional variables related to regulation, property protection and facilitation of economic activity, which are expected to have an impact on economic growth selected (Regulatory Quality, rule of law, Cost of business start-up procedures (% of GNI per capita), Registering property-cost (%of property value) and score starting business) as explanatory variables, i.e. two of these indicators were selected from a total of six governance variables, prepared by the World Bank, and four variables were selected from the ease of doing business variables consisting of ten pillars divided into 52 indicators on the ease of doing business indicators. There were important indicators that served the research, but the required data was not available for them. The GDP represented economic growth, which represents the dependent variable. Governance variables data are available from 1996 to 2022 but Doing Business data were available from 2004 to 2019, so the period (2004-2019) was chosen as the study period. Since the time series was short, we converted the data to semi-annual data, so that it would be more appropriate and give better results. The Vector Error Correction Estimates model was chosen because the data are stationary in the first difference and have cointegration. using EViews 12. The model was represented by the following formula:

LGDP = F (RQ, RL, CS, RPC, SS)… (1)

$$LGDP_t = B_0 + B_1 RQ_t + B_2 RL_t + B_3 CS_t + B_4 RP_t + B_5 SS_t + U_t \cdots (2)$$

Where:

LGDP = Log GDP, the dependent variable.

And (RQ, RL, CS, RPC, SS) are independent variables as defined above.

4.Discussion of Results:

4.1 data description:

The variables used in the research are described in Table 1 in terms of their nature and trends.

Table 1: Descriptive statistics

	GDP (Constant 2015 US$)	CS (% of GNI per capita)	RL (score between -2.5 to 2.5)	RPC (%of property value)	RQ (Score between -2.5 to 2.5)	SS (Score between 0-100)
Mean	1.42E+11	57.4312	-1.6892	7.2375	-1.1825	69.52
Median	1.39E+11	47.6	-1.712	7.15	-1.1315	71.0604
Maximum	2.02E+11	126.9	-1.4482	8.2	0.9913	77.3
Minimum	9.25E+10	30.3	-1.838	6.3	-1.6515	57.4628
Std. Dev.	3.86E+10	28.6408	0. 1152	0.6621	0.1947	5.6819
Sum sq. Dev	2.27E+12	12304.49	0.1991	6.5777	0.5691	484.2622
Observations	16	16	16	16	16	16

Source: Prepared by the researcher based on a program (Eviews12).

4.2 Unit Root Test:

To ensure the stationary of time series data, there are a number of tests. In this research, researcher relied on two tests, PP: (Phillips-Perron) and ADF: (Augmented Dickey –Fuller), the results of these two tests are shown in Table 2.

Table 2: Results of the Unit Root Test for Time Series Extrapolation

	PP: Phillips-Perron				ADF: Augmented Dickey –Fuller			
Variables	level		First Difference		level		First Difference	
	Intercept	Trend & Intercept	Intercept	Trend & Intercept	Intercept	Trend & Intercept	Intercept	Trend & Intercept
LGDP	-0.2185 (0.9165)	-2.1738 (0.4686)	-4.2807 (0.0061)	-4.1545 (0.0281)	-0.2797 (0.9070)	-2.1738 (0.4686)	-4.1924 (0.0071)	-4.0452 (0.0334)
RQ	-3.3852 (0.0289)	-1.9867 (0.5705)	-3.2683 (0.0372)	-4.0557 (0.0334)	-3.1670 (0.0429)	-1.9619 (0.5738)	-3.2434 (0.0389)	-3.2626 (0.1242)
RL	-1.9021 (0.3224)	-1.6819 (0.7083)	-3.7713 (0.0152)	-3.6947 (0.0584)	-3.2054 (0.0453)	-3.4526 (0.0916)	-2.6647 (0.1103)	-2.8644 (0.2100)
CS	-2.0644 (0.2596)	-2.3110 (0.4041)	-4.6445 (0.0033)	-5.0283 0.0070	-2.0969 (0.2480)	-2.4145 (0.3584)	-4.6261 (0.0033)	-4.8522 (0.0092)
RPC	-2.4066 (0.1562)	-2.4504 (0.3432)	-4.0301 (0.0096)	-3.7748 0.0513	-2.4066 (0.1562)	-2.4275 (0.3529)	-3.8972 (0.0121)	-3.7671 (0.0519)
SS	-1.2195 (0.6365)	-2.5314 (0.3107)	-4.1892 (0.0072)	-4.6805 0.0121	-1.2195 (0.6365)	-2.4033 (0.3631)	-2.7863 (0.0870)	-4.4828 (0.0166)

Source: Prepared by the researcher based on a program (Eviews12).

The results of the Unit Root test shown in Table (3) show that the GDP variable is stationary at the First Difference for both Intercept and Trend and intercept for both tests. The RQ variable is stationary at the level at Intercept according to both tests. The RL variable is stationary at the first difference at Intercept in the PP: (Phillips-Perron) test. The CS variable is stationary at the first difference according to both tests for Intercept and Trend & Intercept. As for the TS and RPC variables, they are stationary at the first difference and Intercept, according to both tests. As for the SS variable, it is stationary at the first difference at Intercept and Trend & Intercept according to the PP: (Phillips-Perron) test and stationery at the first difference and Trend & Intercept only according to both tests.

4.3 Cointegration Test:

The table (3) shows the results of Johansen test, to find out if there is a long-term common integration relationship between the model variables.

Table 3: Johansen Test

Variables	Trace Statistic	Critical Value (0.05) Trace statistic	Prob.	Maximum Eigenvalue Statistic	Critical Value (0.05) Maximum Eigenvalue	Prob.**
LGDP*	372.0478	95.75366	0.0000	138.1378	40.07757	0.0000
CS*	233.91	69.81889	0.0000	117.6319	33.87687	0.0000
RL*	116.2782	47.85613	0.0000	55.83908	27.58434	0.0000
RPC*	60.43911	29.79707	0.0000	43.23523	21.13162	0.0000
RQ*	17.20388	15.49471	0.00274	15.62715	14.2646	0.0303
SS	1.576727	3.841465	0.2092	1.576727	3.841465	0.2092

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level.
* Denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Source: Prepared by the researcher based on a program (Eviews12).

The results of the cointegration test shown in Table 3 confirm the existence of a common integration relationship between all research variables at the significance level of 0.05, except SS variable, and thus the alternative hypothesis that confirms the existence of an integration relationship between the research variables is accepted.

4.4 Lag Test:

The table (4) Displays the results of the best Lag test.

Table 4: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-117.3497	NA	0.000199	8.506873	8.789762	8.595471
1	115.3422	353.0498	2.72e-10	-5.058086	-3.077864	-4.437905
2	322.6429	228.7456*	2.86e-15*	-16.87193*	-13.19437*	-15.72016*

* Indicates lag order selected by the criterion
LR: sequential modified LR test statistics (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion
Source: Prepared by the researcher based on a program (Eviews12).

As shown in table (4) all criteria (AIC, SC, HQ, LR, and FPE) select lag = 2 as the best.

4.5 Model Estimation:

After conducting the stability test and ensuring the stability of the data in the first difference and then conducting the variance test and the existence of a long-term relationship between the model variables, comes the model estimation stage. Vector Error Correction Model was chosen to estimate the effect of the independent variables on the dependent variable during the period (2004-2019) using the Eviews12 program. The estimation results are shown in Table 5 and 6.

The Vector Error Correction Model (VECM) results estimate the long-run and short-run effects of independent variables on GDP, the findings in both the long-run and short-run perspectives.

4.5.1 Estimating A Long-Run Relationship (Co-Integration Equation):

Table (5) shows the long-run estimation results.

Table 5: Long-run results (Cointegrating Equation)

Cointegrating Eq:	CointEq1
L GDP (-1)	1.000000
CS (-1)	-0.015996 (0.00031) [-51.9741]
RL (-1)	0.618592 (0.00846) [73.0985]
RPC (-1)	-0.122980 (0.00151) [-81.2241]
RQ (-1)	2.484497 (0.01230) [201.933]
SS (-1)	0.016828 (0.00119) [14.1357]
C	-21.06681

Source: Prepared by the researcher based on a program (Eviews12).

The cointegrating equation represents the long-run equilibrium relationship between GDP and the independent variables as below:

LGDP = -21.06681 + 0.6186 RL + 2.4845 RQ - 0.0160 CS - 0.1230 RPC + 0.0168 SS

After multiplying the long-run equation by -1, the equation changes to the following:

LGDP = 21.06681 - 0.6186 RL - 2.4845 RQ + 0.0160 CS + 0.1230 RPC -0.0168 SS

Since the equation is a log-linear model, each coefficient represents the marginal effect of the corresponding independent variable on log (GDP). To convert an equation into a form that measures elasticity, all variables must be in logarithmic form, because elasticity is defined as the ratio of the relative change in the dependent variable to the relative change in the independent variable, however, because the equation includes two variables with negative values, the equation cannot be converted completely into logarithmic form and the interpretation becomes semi-elasticity, meaning that a one-unit change in the independent variable leads to a relative change in GDP. To express the given equation in a form that clearly represents slope parameters, we can rewrite it in **differential form**, which shows how small changes in independent variables affect log (GDP):

$$d(\log(GDP)) = -0.6186\,d(RL) - 2.4845\,d(RQ) + 0.0160\,d(CS) + 0.1230\,d(RPC) - 0.0168\,d(SS)$$

the slope of each independent variable Xi is simply its corresponding coefficient βi, thus, the slope of each variable is:

$$\frac{\partial \log(gdp)}{\partial RL} = -0.6186$$

$$\frac{\partial \log(gdp)}{\partial RQ} = -2.4845$$

$$\frac{\partial \log(gdp)}{\partial CS} = 0.0160$$

$$\frac{\partial \log(gdp)}{\partial RPC} = 0.1230$$

$$\frac{\partial \log(gdp)}{\partial SS} = -0.0168$$

Interpretation of the values of slopes:

1- A one-unit increase in RL leads to a 0.6186×100=61.86% decrease in GDP.
2- A one-unit increase in RQ leads to a 2.4845×100=248.45% decrease in GDP.
3- A one-unit increase in CS leads to a 0.0160×100=1.6% increase in GDP.
4- A one-unit increase in RPC leads to a 0.1230×100=12.3%increase in GDP.
5- A one-unit increase in **SS** leads to a 0.0168×100=1.68% decrease in GDP.

As shown above RL (-1), RQ (-1) and SS (-1) have a significant negative effect to GDP, these results are not consistent with economic theory, but may be consistent with the reality of the Iraqi economy which suffers from weak institutions and complex implementation of policies and procedures, because the relationship between the rule of law, regulatory quality, and economic growth in developing countries, is complex. While robust legal frameworks and effective regulations are associated with positive economic outcomes, in certain contexts, they can inadvertently hinder Gross Domestic Product (GDP) growth. In many developing nations, the institutions responsible for enforcing laws and regulations may lack the necessary resources, In Iraq, for instance, the judiciary's operational challenges—such as security concerns, and limited technical resources—have undermined its effectiveness, leading to unpredictability in legal enforcement and deterring economic (https://www.brookings.edu/articles/iraqs-rule-of-law/?utm_source=chatgpt.com). Bureaucracy, corruption, and heavy reliance on state-owned sectors may explain why some positive economic indicators show an adverse effect, pervasive corruption has been identified as a significant barrier to economic development, with funds often diverted away from public investment into private hands, thereby stifling growth (https://borgenproject.org/fragility-and-rule-of-law-in-iraq/)

The CS (-1) and RPC (-1) have a positive significant effect, these results are not consistent with economic theory, because increasing in costs of starting economic activity do not encourage investors to embark on new projects, also the costs of registering property were expected to negatively impact economic activity. This result may be due to the presence of other obstacles that have a greater impact on the country's GDP, or due to the large size of parallel economic activity that does not adhere to the procedures for starting economic activity. On the other hand, registered property can serve as collateral for loans, facilitating access to credit for property owners, this access enables entrepreneurs and businesses to invest in new ventures or expand existing operations, driving economic growth (USAID Iraq Local Governance Program, 2005). (Klapper, 2010) points out that light reforms that reduce costs of starting a business by 40% have no effect on increasing the number of enterprises and thus on GDP, a result close to what this study found.

However, these results, which contradict economic theory, may be justified by the transitional phase prevailing in the country, which resulted in the emergence of parallel activity operating outside of regulations and laws.

4.5.2 Estimating A Short-Run Relationship:

Table (6) shows the short-run estimation results.

Table 6: short-run results (Error Correction Model)

Error Correction	D (LOG_GDP)
CointEq1	-0.014596 (0.00394) [-3.70388]
D(LGDP(-1))	0.992699 (0.20136) [4.93003]
D(LGDP(-2))	-0.996938 (0.19517) [-5.10800]
D(CS(-1))	-0.000914 (0.00154) [-0.59279]
D(CS(-2))	-0.002054 (0.00131) [-1.57352]
D(RL(-1))	0.080302 (0.08572) [0.93684]
D(RL(-2))	-0.169340 (0.11848) [-1.42921]
D(RPC(-1))	-0.004971 (0.01750) [-0.28400]
D(RPC(-2))	0.011173 (0.01860) [0.60071]
D(RQ(-1))	-0.200818 (0.13078) [-1.53559]
D(RQ(-2))	-0.148013 (0.10541) [-1.40420]
D(SS(-1))	0.001492 (0.01001) [0.14903]
D(SS(-2))	-0.018018 (0.00821) [-2.19524]
C	0.037628 (0.00553) [6.80287]
R-squared 0.921113	F-statistic 12.57461
Adjusted R squared 0.847862	Akaike AIC -6.382902
Sum sq. resids 0.001019	Schwarz SC -5.716799
S.E. equation 0.008533	Log likelihood 103.3606
Mean dependent 0.027250	S.D. dependent 0.021877

Source: Prepared by the researcher based on a program (Eviews12).

CointEq1: This is the error correction term, which measures the speed of adjustment back to the long-term equilibrium. The coefficient is -0.014596 for D(LOG_GDP) is significant, the negative coefficient indicates that about 1.46% of the disequilibrium in GDP is corrected each period. The adjustment is slow.

In the short run the variable D(CS(-1)), D(CS(-2)) and D(RPC(-1)) have a negative but insignificant effect on GDP, this means an increase by 1% leads to a decrease in GDP by 0.091%., 0.21% and 0.50 respectively, these effects are consistent with economic theory. However, for D(RQ(-1)) and D(RQ(-2)) have a negative and insignificant effect, this means an increase by 1% leads to a decrease in GDP by 20%., 14.8% respectively, this result contradicts economic theory but may be realistically justified as regulatory changes require a period of time to take effect. The effect of D(SS(-1)) is positive and insignificant but changed to a negative effect with two lags. The short-run effects are weak and often statistically insignificant, a common feature in economic models where structural reforms take a long time to impact GDP. This suggests that business climate improvements and regulatory reforms contribute to long-term growth, but their short-term impact is limited. These results show that the Iraqi economy responds slowly to changes and improvements.

As shown by the estimation results that shown in Table 6, the value of R squared is 0.92%, this means that the independent variables explain the 0.92%, of change in the dependent variable. It appears from the table that the difference between R squared and Adjusted R squared is small, which indicates the correctness of the choice of variables. On the other hand, the value of the (F-statistic) is 12.57461 are significant for all equations, indicating that the model is statistically significant. The log likelihood values 103.3606 are high, and the Akaike (AIC) -6.382902 and Schwarz (SC) -5.716799 information criteria suggest that the model is well-fitted.
The estimation results using the VECM model show that there is a long-run equilibrium relationship between GDP and the independent variables (CS, RL, RPC, RQ and SS). In the short run, the system adapts to deviations from this equilibrium.

5. Diagnostic tests for model validity:

5.1 Normality test:

To ensure that the residuals of the VECM meet the assumptions of normality, no autocorrelation, and no heteroscedasticity, the table (7) shoe the results of the teste:

Table 7: Normality Tests

Component	Jarque-Bera	df	Prob.
1	1.175387	2	0.5556
2	0.897232	2	0.6385
3	0.804182	2	0.6689
4	3.727376	2	0.1551
5	0.990785	2	0.6093
6	0.671582	2	0.7148
Joint	8.266545	12	0.7640

Source: Prepared by the researcher based on a program (Eviews12).

5.2 heteroscedasticity test (WALD TEST):

The Wald Test checks whether the variance of the residuals is constant across all levels of the independent variables. If the test indicates heteroscedasticity, it means that the error terms do not have a constant variance.

Table 8: Residual Heteroskedasticity Tests

Joint test:		
Chi-sq	df	Prob.
285.9977	294	0.6200

Source: Prepared by the researcher based on a program (Eviews12).

Since the value of Prob. is greater than 0.05, the model does not suffer from the problem of heteroscedasticity.

5.3 Stability Test (Inverse Roots of AR Characteristic Polynomial):

This test explains whether the model is stable or explosive.

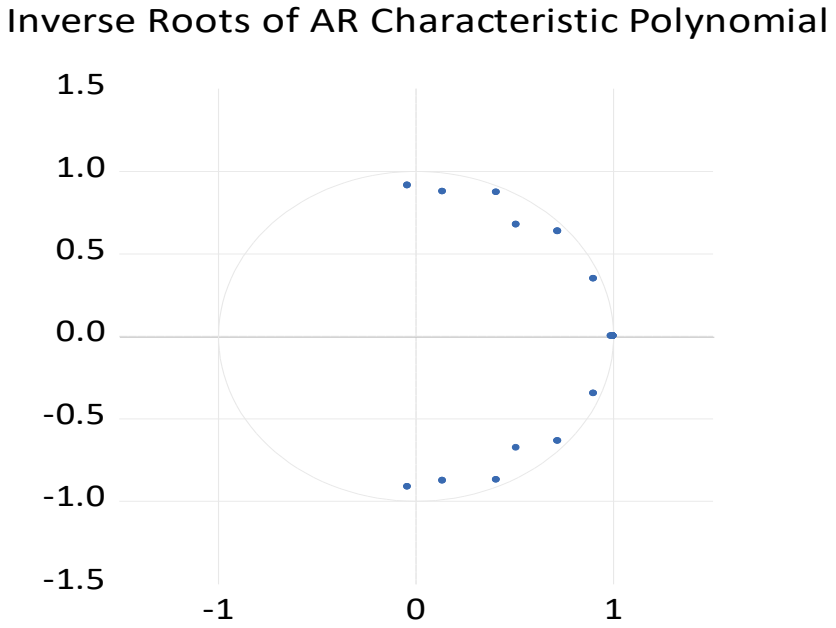

Figure1: AR Characteristic polynomial.

Source: Prepared by the researcher based on a program (Eviews12).

It is clear from Figure 1 that all values lie inside the circle, which indicates that the model parameters are stable and therefore the model has structural stability.

6.Conclusion:

After converting the data to semi-annual data, it became possible to measure the relationship using a vector error correction model. The long-run estimation results were not consistent with economic theory, but these results may be justified in a country like Iraq, which has suffered from wars, conflicts, chaos, and the absence of institutions and law.

In the short-run, the effect of the independent variables on the dependent variable was insignificant, but the effect of the variables D(CS (-1)), D(CS(-2)), D(RL(-1)), D(RPC(-1)) and D(SS(-1)) was consistent with economic theory and previous studies.

The CointEq1 coefficient, which expresses the speed of adjustment, indicates that the model tends to adjust slowly in the long term. This means that the Iraqi economy requires more time to

return to a stable path. The estimation results are consistent with economic theory and previous studies.

The model was a good fit in terms of test results. R squared and Adjusted R squared (F-statistic), log-likelihood, Akaike (AIC), and Schwarz (SC) suggest that the model is well-fitted.

7. Limitations and Recommendations:

Due to the lack of complete data for a long period, we were forced to choose the period (2004-2019), but institutional reforms take a long time and may need a period to be reflected in economic activity. In addition, the database includes a large group of important institutional variables, but the research was unable to use them due to the unavailability of data on Iraq. Therefore, we suggest that researchers, if more data is available, repeat the research for a longer period and include other variables that were not studied in this research.

The research suggests that decision-makers, experts, and consultants work on amending the laws related to economic activity toward more transparency and ease. It also works on ending the hidden hands that stand behind obstructing new projects in order to obtain a share of the projects and take bribes. Reduce bureaucratic barriers and streamline business registration to encourage investment.

Authors Declaration:

Conflicts of Interest: None

-We Hereby Confirm That All the Figures and Tables in The Manuscript Are Mine and Ours. Besides, The Figures and Images, which are Not Mine, Have Been Permitted Republication and Attached to The Manuscript.

- Ethical Clearance: The Research Was Approved by The Local Ethical Committee at The University.

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